

The assassin bug genus *Emesopsis* (Heteroptera, Reduviidae, Emesinae) in Thailand¹

T. ISHIKAWA & S. OKAJIMA

Abstract: Six species of the emesine assassin bug genus *Emesopsis* UHLER are reported from Thailand. Two of them are the previously described species, *E. albispinosa* and *E. nubila*, and the others are described as new species, *E. bifurcata* nov.sp. (including material from Vietnam), *E. ernsti* nov.sp., *E. heissi* nov.sp. and *E. parvispinosa* nov.sp.

Key words: Emesinae, *Emesopsis*, Ploiarolini, Reduviidae, Thailand.

Introduction

Emesopsis UHLER belongs to the tribe Ploiarolini of the assassin bug subfamily Emesinae and is distinguished from the other genera of the tribe by the protarsus at most one-fourth as long as the protibia and the hemelytron with a small quadrate basal cell situated at inner anterior angle of discal cell.

Twenty-three species have been described from the Oriental and Australian Regions, including the tropicopolitan *E. nubila* UHLER 1893 (MALDONADO CAPRILES 1990; ISHIKAWA & YASUNAGA 2004; ISHIKAWA & OKAJIMA 2004). However, no species has been reported from Thailand.

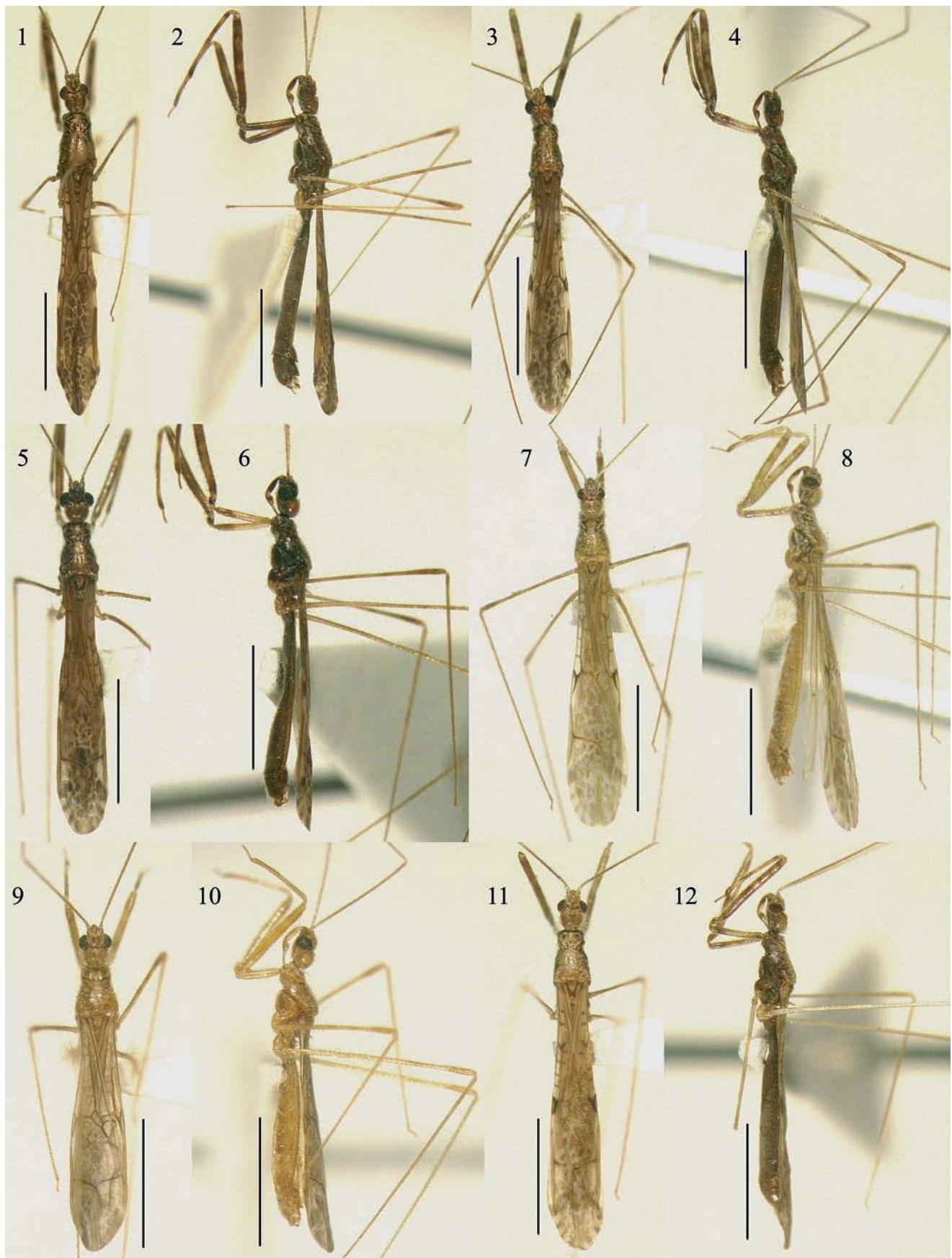
In a series of *Emesopsis* specimens recently obtained from Thailand, we confirmed six species; two of them were identical with *E. nubila* UHLER and *E. albispinosa* ISHIKAWA & OKAJIMA, the latter only known from southern Vietnam so far, and the others were not corresponding to any described species. In this paper, we describe four new species, and provide diagnoses for *E. albispinosa* and *E. nubila*.

Material and Methods

Male and female genitalia were soaked in hot 10 % KOH solution for about five minutes, and the endosoma of the male genitalia was pulled out of the phallosoma with forceps. Observations were made under a stereoscopic microscope (Olympus SZH10) and a compound microscope (Olympus CH2). Illustrations were drawn using the stereoscopic microscope for Figs 25-28, 36-39, 47-50 and 59-62, and the compound microscope for Figs 29-35, 40-46, 51-58 and 63-69, each with the aid of a drawing tube. After observations, genitalia were preserved in small glass tubes with glycerin. Specimens shown in Figs 1, 2 and 9-12 were photographed before dissection of genitalia.

The material used in this study is preserved in the Laboratory of Insect Resources, Faculty of Agriculture, Tokyo University of Agriculture, Kanagawa, Japan. All measurements are given in mm. Terminology generally follows that of WYGODZINSKY (1966).

¹ This paper is dedicated to Dr. DI Ernst Heiss to celebrate his 70th birthday.



Figs 1-12: *Emesopsis* spp., dorsal (1, 3, 5, 7, 9, 11) and lateral (2, 4, 6, 8, 10, 12) views. (1, 2) *E. albispinosa*, male; (3, 4) *E. bifurcata*, male; (5, 6) *E. ernsti*, male; (7, 8) *E. heissi*, male; (9, 10) *E. nubila*, male; (11, 12) *E. parvispinea*, male. Scales: 2.0 mm.

Taxonomy

Genus *Emesopsis* UHLER 1893

Emesopsis UHLER 1893: 718 (nov.gen.), type species by monotypy: *Emesopsis nubilus* UHLER 1893.

Calphurnia DISTANT 1909: 502, type species by monotypy: *Calphurnia reticulata* DISTANT 1909 (= *Emesopsis nubila* UHLER 1893) (syn. by WYGODZINSKY & USINGER 1960: 243).

Hadrocranella HORVÁTH 1914: 647, type species by monotypy: *Hadrocranella imbellis* HORVÁTH 1914 (syn. by WYGODZINSKY & USINGER 1960: 243).

Emesopsis (*Hadrocranella*): MCATEE & MALLOCH 1926: 119.

This genus is characterized by having the head and thorax usually with densely distributed, long, wooly, decumbent setae, the rostral segment II distinctly swollen, the pronotum not carinate laterally, the metanotum with a spine, the profemoral spines much shorter than width of the profemur, the protarsus at most one-fourth as long as the protibia, the hemelytron with a small, quadrate basal cell situated laterally at base of a discal cell, the hindwing with a distinct hamus, and the pygophore with a posterior process (WYGODZINSKY 1966).

WYGODZINSKY & USINGER (1960) and WYGODZINSKY (1966) stated that *Emesopsis* is most diverse in the Philippines, Peninsular Malaysia and New Guinea. However, it was suggested by ISHIKAWA & OKAJIMA (2004) that a greater number of species would be found throughout tropical continental Asia. Their suggestion is corroborated by the present discovery of six species of *Emesopsis* in Thailand.

Specimens of all species examined in this study were collected for the most part from dead, drooping leaves of banana, *Musa acuminata* (Musaceae), growing along forests and on grasslands beside a river.

Emesopsis albispinosa ISHIKAWA & OKAJIMA 2004 (Figs 1, 2, 13, 19, 56)

Emesopsis albispinosa ISHIKAWA & OKAJIMA 2004: 167.

Specimens examined: Thailand: Pan Klang, 1,000–1,200 m alt., Doi Mae Tho, Chiang Mai: 1♂ (Figs 1, 2, 13), 2♀ (one shown in Figs 19, 56), 7.vi-ii.2001, T. Ishikawa; Ban Maeo, 1,000 m alt., Doi Pui, Chiang Mai: 1♀, 9.viii.2001, T. Ishikawa.

Diagnosis: Recognized by the head and

pronotum discally yellowish brown with long erect setae (Figs 1, 2), the antennal segment I covered with long erect setae, which are about 3.5 times as long as maximum width of the segment I, the scutellum with a whitish apical spine, the pygophore with a spine-shaped posterior process, the paramere slender, weakly tapered and apically curved, the endosoma of phallus with two pairs of long membranous expansions in addition to a pair of vesica arms, the vesica arm dorsally spinulate at basal 1/3 and abruptly upturned at middle, and the styloid of the female narrow, arched posteriorly and slightly projected posteriad at middle (Fig. 56). Body length 6.4–6.8 mm.

Remarks: This species was recently described from southern Vietnam by ISHIKAWA & OKAJIMA (2004). The discovery of this species in northern Thailand indicates that the species may be widely distributed in Indochina.

Emesopsis bifurcata nov.sp. (Figs 3, 4, 14, 20, 25–35)

Type series: Holotype: ♂ (Figs 3, 4, 14, 25–27), Mae Sa, 400–450 m alt., Mae Rim, Chiang Mai, Thailand, 15.v.2002, T. Ishikawa. Paratypes: Thailand: same data as holotype: 1♂, 2♀; same locality as holotype: 1♂ (Figs 29–31), 1.vi-ii.2001, S. Nagashima; 3♀ (one shown in Fig. 32), 16.v.2002, T. Ishikawa. Vietnam: Mai Chau, Hoa Binh, 1♂ (Figs 20, 28, 33–35), 11.viii.2000, S. Okajima.

Diagnosis: Recognized by head and pronotum discally yellowish brown with long erect setae (Figs 3, 4), dark mesocoxa with brownish yellow apex, paramere strongly bent upward at apical 1/3 and bifurcate at apex (Fig. 31), asymmetrical endosoma of phallus with a spinose expansion and a large, flattened, sclerotized expansion in addition to a pair of vesica arms (Figs 33–35), and vesica arm bent at apical 1/3 and armed with many small spines near apex (Figs 33–35).

Description:

Male: Coloration: Body generally dark brown (Figs 3, 4). Dorsum of head and disc of pronotum yellowish brown (Fig. 3). Antennal segment I brownish yellow; segments II, III and IV dark brown. Rostrum dark brown, with apex of segment I and base of segment III pale. Scutellar and metanotal



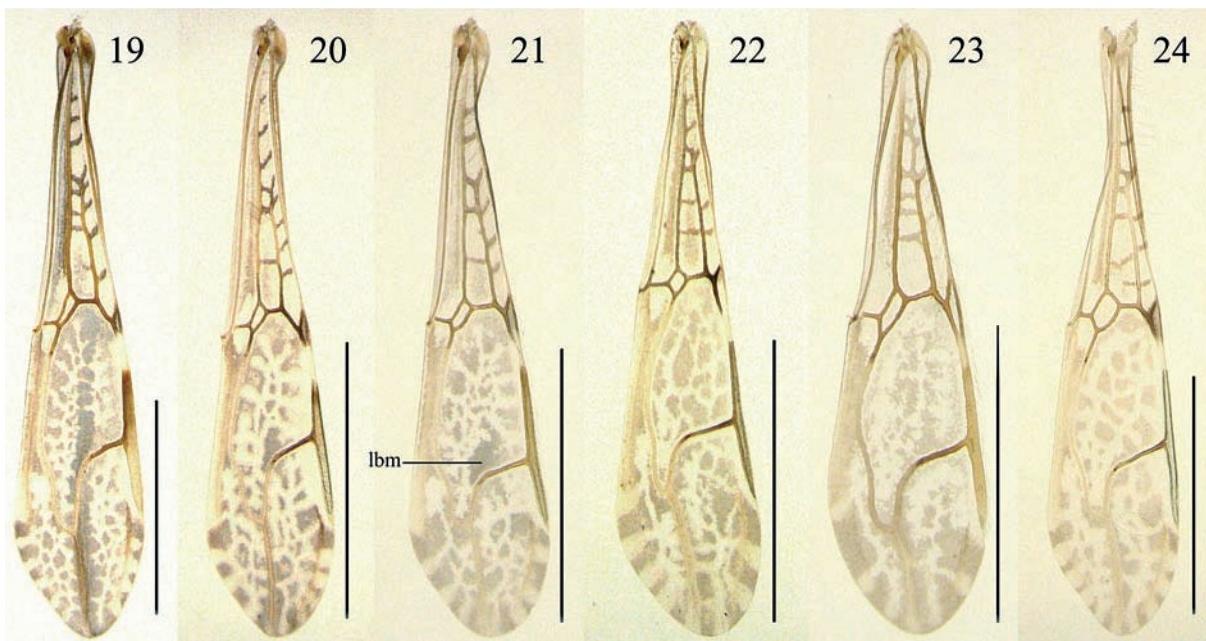
Figs 13-18: Femora of *Emesopsis* spp. (13) *E. albispinosa*; (14) *E. bifurcata*; (15) *E. ernsti*; (16) *E. heissi*; (17) *E. nubila*; (18) *E. parvispinea*. Scales: 0.5 mm.

spines brownish yellow. Proleg brownish yellow; coxa dark brown at base and on apical 1/3; trochanter dark brown; femur (Fig. 14) irregularly darkened at apex, middle and base; tibia darkened on apical 1/10, with narrow dark annulation at basal 1/10 and broad dark annulation at basal 2/5; tarsal segment II dark brown basally. Meso- and metalegs brownish yellow; femur weakly darkened subapically; mesocoxa dark brown, with apex brownish yellow. Hemelytron (Fig. 20) brownish yellow, decorated with about 9 transverse, vein-like, dark brown markings on basal half, and with many irregular, small to medium-sized, brownish markings on apical half. Abdomen dark brown.

Structure: Head (Fig. 25) 1.7 times as long as width across eyes, sparsely furnished with long, erect, apically curved setae densely intermixed with wooly decumbent setae; anteculus about 0.8 times as long as postoculus; interocular furrow arched posteriad. Eye large, prominent laterad, not reaching level of ventral surface of head in lateral view (Fig. 25), 0.8 times as wide as interocular space in dorsal view. Antennal segment I covered with long erect setae intermixed with short decumbent setae; longest setae 4 times as long as maximum width of segment I; segments II, III and IV with short decumbent setae; proportion of segments I to IV 10: 9: 3: 2. Rostrum sparsely covered with curved and suberect setae; proportion of segments I to III 11: 5: 8.

Pronotum 1.2 times as long as head, 1.3 times as long as humeral width, sparsely covered with long erect setae intermixed with wooly decumbent setae; anterior lobe with several pairs of glabrous areas; posterior lobe 1.4 times as long as anterior lobe, with anteriorly arcuate posterior margin. Scutellum apically with short spine horizontally produced posteriad. Metanotal spine erect, with acute apex.

Proleg (Figs 14, 26, 27) covered with long, suberect and decumbent setae intermixed with short decumbent setae; coxa about 8 times as long as its maximum width; femur 1.9 times as long as coxa, about 11 times as long as its maximum width, with anteroventral and posteroventral series of 1 large, 3 medium-sized and about 65 small spines and conical tubercles each; basal-most spine of posteroventral series largest, situated near junction of trochanter and femur (Fig. 27); tibia 0.8 times as long as femur; tarsus 2-segmented, 0.15 times as long as tibia. Meso- and metalegs slender; femur covered with suberect setae on basal 1/3 and with short decumbent setae on apical 2/3; longest setae about twice as long as width of base of metafemur; tibia with short decumbent setae entirely. Hemelytron (Figs 20, 28) exceeding apex of abdomen; basal cell (Fig. 28; bc) rectangular; M and Cu veins proximal to discal cell (Fig. 28; cv, mv) not forming elongate subbasal cell, but connected by transverse, vein-like, brown markings; M vein distal to discal cell without bifurcate branch.



Abdomen furnished with short decumbent setae; anterior portion of fused tergites I and II with erect spine. Pygophore excluding posterior process about 1.9 times as long as its height, posterolaterally projected triangularly (Figs 29, 30); posterior process (Figs 29, 30; pp) weakly compressed dorsoventrally, widened basally, tapered, upturned near apex, with obtuse apex. Paramere (Fig. 31) strongly bent upward at apical 1/3, widened in apical 1/3, bifurcate at apex, covered with erect and suberect setae variable in length on apical half. Endosoma of phallus (Figs 33-35) asymmetrical, with 2 expansions in addition to a pair of vesica arms; vesica arm (va) symmetrical, long, bent dorsally and widened at apical 1/3, strongly curved apically, dorsally armed with many small spines near apex; left expansion (le) about 1/3 as long as vesica arm, with many minute spines dorsally; right expansion (re) large, flattened, sinuate, sclerotized, widened basally.

Female: Almost the same in general appearance as male. Antennal segment I covered with short decumbent setae that are about twice as long as maximum width of segment I. Abdomen apically narrowed and rounded. Valvulae II large, crimped transversely, entirely membranous. Styloid (Fig. 32) V-shaped, roundly projected anteriorly at middle, concave at middle of posterior margin.

Measurements (holotype): Body length 5.47 (paratypes: 5.47-5.60 in male, 5.40-

5.84 in female). Head length including neck 0.67; width across eyes 0.57; interocular space 0.21. Antenna length 7.18; lengths of segments I, II, III and IV 3.07, 2.60, 0.91 and 0.6. Rostrum length 0.85; lengths of segments I, II and III 0.39, 0.18 and 0.28. Pronotum length 0.81; width across humeri 0.60. Hemelytron length 4.38. Lengths of femur, tibia and tarsus of proleg 1.71, 1.35 and 0.20; of mesoleg 2.79, 3.78 and 0.15; of metaleg 4.10, 5.77 and 0.16, respectively. Abdomen length 3.38.

Distribution: Northern Thailand, northern Vietnam.

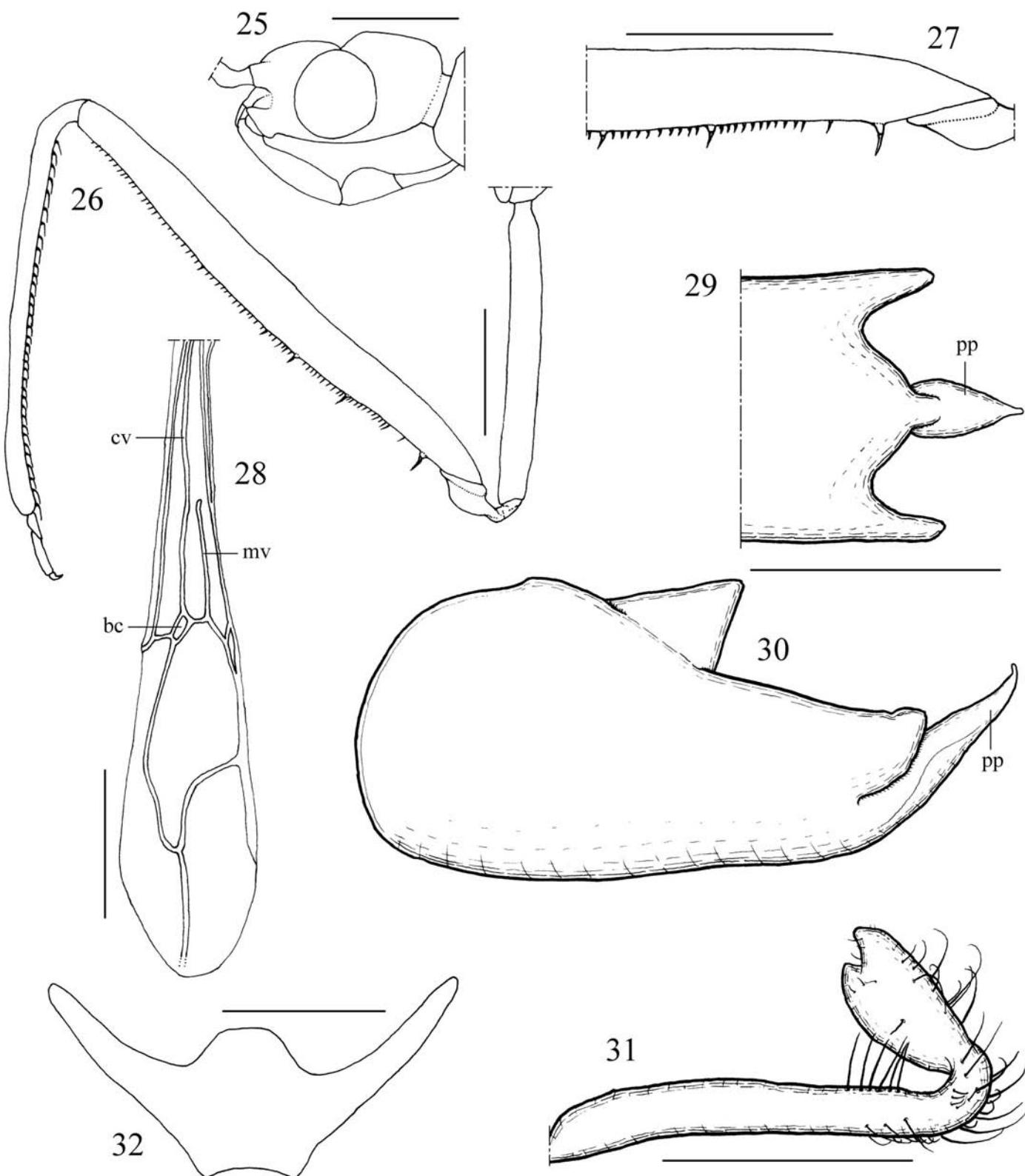
Etymology: From the Latin *bifurcata*, alluding to the bifurcate apex of the paramere; an adjective.

Remarks: In general appearance, this new species is most similar to *Emesopsis impar* ISHIKAWA & YASUNAGA 2004, described from Japan, from which it is separable by more inconspicuous, brownish markings on the apical half of the hemelytra (Fig. 20) (in *E. impar*, rather distinct), the bifurcate apex of the paramere (Fig. 31) (not bifurcate), different shape of the expansions arising from the vesica arms (Figs 33-35), and different shape of the female styloid (Fig. 32).

Emesopsis ernsti nov.sp. (Figs 5, 6, 15, 21, 36-46)

Type series: Holotype: ♂ (Figs 5, 6, 15, 36-38), Mae Sa, 400-450 m alt., Mae Rim, Chiang

Figs 19-24: Right hemelytra of *Emesopsis* spp. (19) *E. albispinosa*; (20) *E. bifurcata*; (21) *E. ernsti*; (22) *E. heissi*; (23) *E. nubila*; (24) *E. parispinea*. Abbreviation: lbm – largest brownish marking within discal cell. Scales: 2.0 mm.



Figs 25-32: *Emesopsis bifurcata* (setae omitted except for 31). (25) head, lateral view; (26) proleg; (27) base of profemur; (28) right hemelytron; (29) apical part of pygophore, ventral view; (30) pygophore, lateral view; (31) left paramere, lateral view; (32) stylid, dorsal view. Abbreviations: bc – basal cell; cv – Cu vein; mv – M vein; pp – posterior process. Scales: 0.1 mm for 32, 0.3 mm for 29-31, 0.5mm for 25-27, 1.0 mm for 28.

Mai, Thailand, 16.v.2002, T. ISHIKAWA.
 Paratypes: same data as holotype: 1♂ (Figs 21, 39, 42, 43), 2♀♀; same locality as holotype: 1♂, 1.viii.2001, S. Nagashima; 1♂ (Figs 40, 41, 45, 46), 3.viii.2001, T. Ishikawa; 3♀♀ (one shown in Fig. 44), 4.viii.2001, T. Ishikawa; 2♀♀, 17.v.2002, T. Ishikawa.

Diagnosis: Recognized by pronotum distally yellowish brown with long erect setae (Figs 5, 6), dark mesocoxa with brownish yellow apex, meso- and metafemora basally covered with erect and suberect setae, which are about 2.5 times as long as width of base of the metafemur, meso- and metatibiae covered with short decumbent setae only, hemelytron with a conspicuous dark marking near apex of discal cell (Fig. 21), pygophore with a flattened, apically narrowed posterior process (Figs 40, 41), short, apically thickened paramere (Figs 42, 43), endosoma of phallus with a pair of slender sclerotized expansions dorsally in addition to a pair of vesica arms (Figs 45, 46), and slender vesica arm with ridged, short, sub-sclerotized expansion near base (Figs 45, 46).

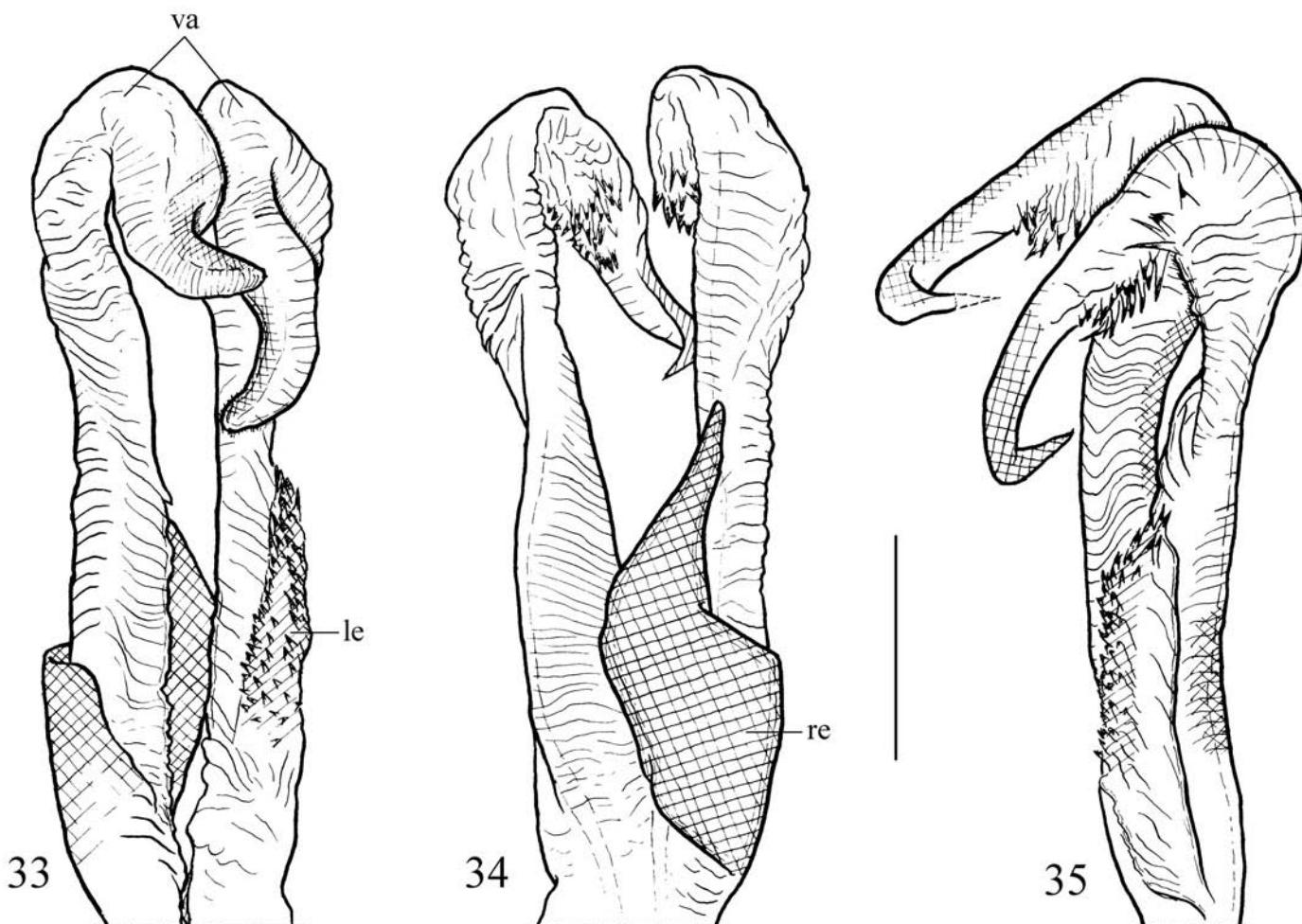
Description:

Male: Coloration: Body generally dark brown (Figs 5, 6). Disc of pronotum yellowish brown (Fig. 5). Antennal segment I brownish yellow; segments II, III and IV dark brown. Rostrum dark brown, with base of segment III and apices of segments I and II pale. Scutellar and metanotal spines brownish yellow. Proleg brownish yellow; coxa brown on apical 3/10; trochanter brown on apical half; femur (Fig. 15) irregularly darkened at apex, middle and base; tibia darkened on apical 1/10 and on middle broadly, with narrow dark annulation subbasally; tarsus brown. Meso- and metalegs brownish yellow; femur weakly darkened at base and apex; tibia weakly darkened apically; mesocoxa dark, with apex brownish yellow. Hemelytron (Fig. 21) yellowish brown, decorated with about 8 transverse, vein-like, dark brown markings on basal half, and with many irregular, small to medium-sized, brownish markings on apical half; largest brownish marking within discal cell (Fig. 21; lbm) darker than others, situated near apex of discal cell, conspicuous when hemelytra held on abdomen. Abdomen brown, darkened basally.

Structure: Head (Fig. 36) 1.3 times as long as width across eyes, sparsely furnished with long, erect, apically curved setae densely intermixed with wooly decumbent setae; anteoculus about 0.7 times as long as postoculus; interocular furrow arched posteriad. Eye large, prominent laterad, not reaching level of ventral surface of head in lateral view (Fig. 36), 0.9 times as wide as interocular space in dorsal view. Antennal segment I covered with short, curved, decumbent and suberect setae; longest setae about 3 times as long as maximum width of segment I; segments II, III and IV with short decumbent setae; proportion of segments I to IV 11: 8: 4: 2. Rostral segment I covered with curved setae on outer surface; segments II and III sparsely furnished with short suberect setae; proportion of segments I to III 12: 5: 8.

Pronotum 1.2 times as long as head, 1.3 times as long as humeral width, sparsely covered with long erect setae intermixed with wooly decumbent setae; anterior lobe with several pairs of glabrous areas; posterior lobe 1.6 times as long as anterior lobe, with anteriorly arcuate posterior margin. Scutellum apically with short spine horizontally produced posteriad. Metanotal spine obliquely erect, with acute apex.

Proleg (Figs 15, 37, 38) covered with long, erect and suberect setae intermixed with decumbent short setae; coxa about 7.5 times as long as its maximum width; femur twice as long as coxa, about 12 times as long as its maximum width, with anteroventral and posteroventral series of 1 large, 5 medium-sized and about 65 small spines and conical tubercles each; basal-most spine in posteroventral series largest, situated near junction of trochanter and femur (Fig. 38); tibia 0.8 times as long as femur; tarsus 2-segmented, 0.18 times as long as tibia. Meso- and metalegs slender; femur covered with long erect and suberect setae on basal half and with short to long decumbent setae on apical half; longest setae about 2.5 times as long as width of base of metafemur; tibia with short decumbent setae entirely. Hemelytron (Figs 21, 39) exceeding apex of abdomen; basal cell (Fig. 39; bc) rectangular; M and Cu veins proximal to discal cell (Fig. 39; cv, mv) not forming elongate subbasal



Figs 33-35: Endosoma of *Emesopsis bifurcata*, dorsal (33), ventral (34) and left-lateral (35) views. Abbreviations: le – left expansion; re – right expansion; va – vesica arm. Scale: 0.1 mm.

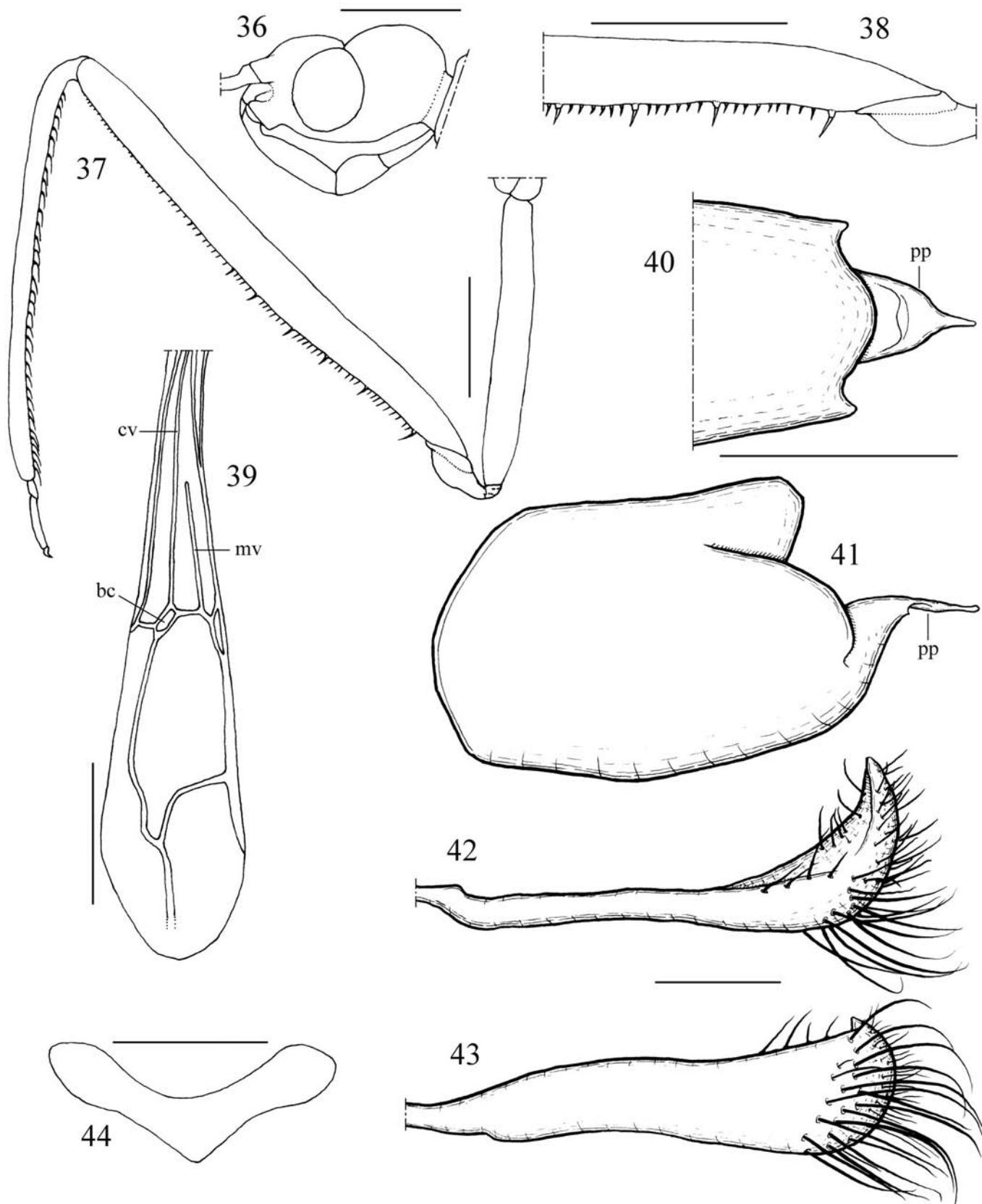
cell, but connected by transverse, vein-like, brown markings; M vein distal to discal cell without bifurc branch.

Abdomen furnished with long suberect setae densely intermixed with short, decumbent and suberect setae; anterior portion of fused tergites I and II with erect spine. Pygo-phore excluding posterior process about 1.6 times as long as its height, slightly projected posterolaterally (Figs 40, 41); posterior process (Figs 40, 41; pp) flattened dorsoventrally, projected posteriad, narrowed apically, with tiny tooth-like tubercle basally on each side. Paramere (Figs 42, 43) short, compressed laterally, curved and thickened apically, acute at apex, covered with erect and suberect setae variable in length on apical 1/3. Endosoma of phallus (Figs 45, 46) symmetrical, with a pair of sclerotized expansions dorsally in addition to a pair of vesica arms; vesica arm (va) slender, tapered, somewhat widened at middle, ventrally sclerotized, dorsally decorated with several tiny triangular tubercles at middle, and dor-

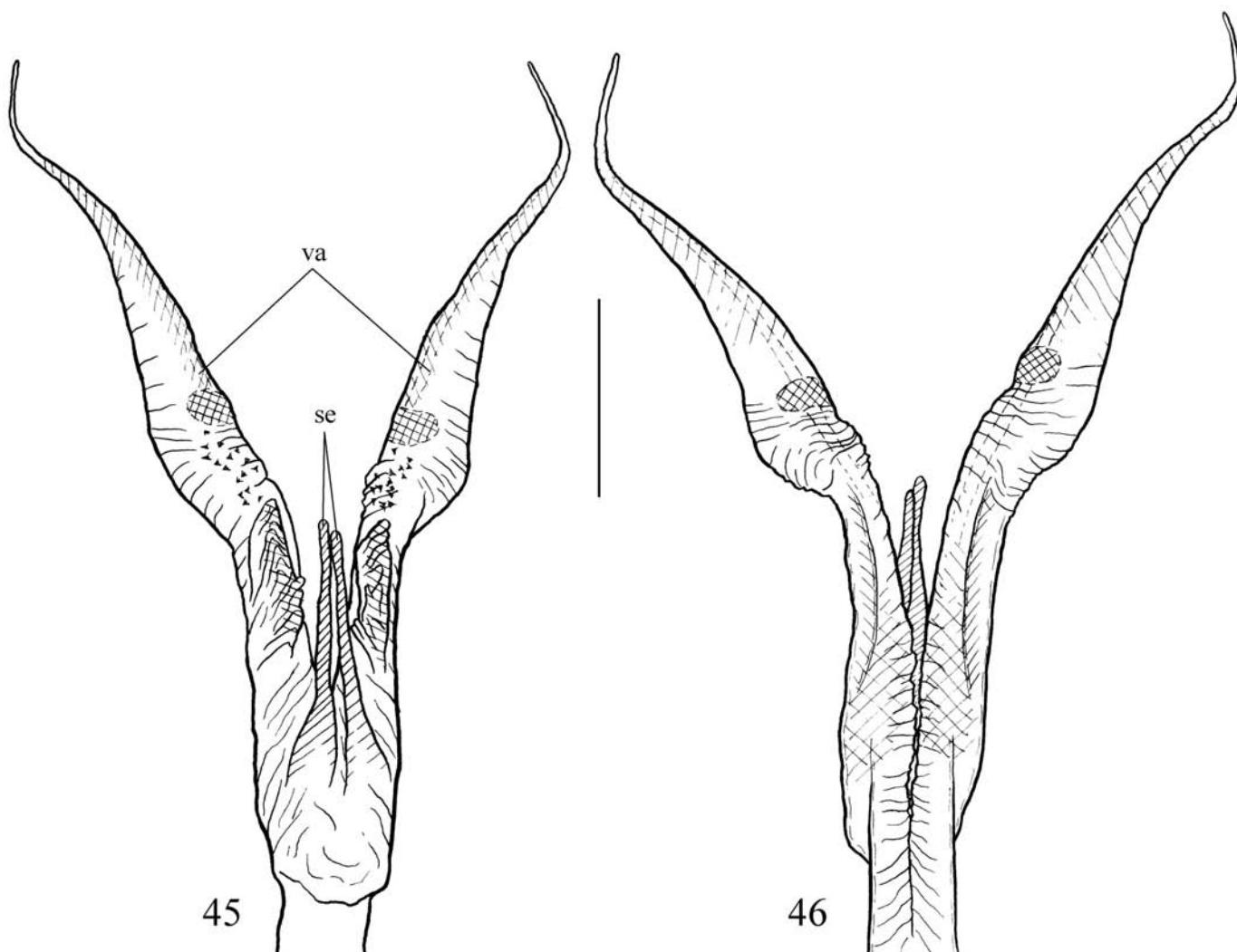
sally with ridged, short, sub-sclerotized expansion near base; sclerotized expansion (se) slender, thinner than vesica arm, about 0.4 times as long as vesica arm, obtuse at apex.

Female: Almost the same in general appearance as male. Eye 0.8 times as wide as interocular space in dorsal view. Abdomen apically narrowed and rounded. Valvulae II large, crimped transversely, entirely membranous. Styloid (Fig. 44) widened at both ends, angularly projected posteriad, with posteriorly arcuate anterior margin.

Measurements (holotype): Body length 5.38 (paratypes: 5.12-5.38 in male, 5.16-5.54 in female). Head length including neck 0.71; width across eyes 0.57; interocular space 0.20. Antenna length 7.15; lengths of segments I, II, III and IV 3.07, 2.36, 1.16 and 0.56. Rostrum length 0.88; lengths of segments I, II and III 0.42, 0.18 and 0.28. Pronotum length 0.85; width across humeri 0.67. Hemelytron length 2.25. Lengths of femur, tibia and tarsus of proleg 1.81, 1.40



Figs 36-44: *Emesopsis ernsti* (setae omitted except for 42, 43). (36) head, lateral view; (37) proleg; (38) base of profemur; (39) right hemelytron; (40) apical part of pygophore, ventral view; (41) pygophore, lateral view; (42, 43) – left paramere, dorsal (42) and lateral (43) views; (44) stylid, dorsal view. Abbreviations: bc – basal cell; cv – Cu vein; mv – M vein; pp – posterior process. Scales: 0.1 mm for 42-44, 0.3 mm for 40, 41, 0.5mm for 36-38, 1.0 mm for 39.



Figs 45, 46: Endosoma of *Emesopsis ernsti*, dorsal (45) and ventral (46) views.
Abbreviations: se – sclerotized expansion; va – vesica arm. Scale: 0.1 mm.

and 0.23; of mesoleg 2.90, 3.78 and 0.18; of metaleg 4.38, 6.07 and 0.18, respectively. Abdomen length 3.23.

Distribution: Northern Thailand.

Etymology: The specific name is dedicated to Dr. Dipl. Ing. Ernst HEISS for his great contribution to the Heteroptera; a noun in the genitive case.

Remarks: This new species resembles *Emesopsis longipilosa* ISHIKAWA & OKAJIMA 2004 in having long setae on the head and pronotum, large brownish marking situated near the apex of the discal cell of the hemelytron, a flattened posterior process on the pygophore, and so on. However, this new species is separable from the latter by the interocular furrow arched posteriad (in *E. longipilosa*, almost straight), the antennal segment I lacking long erect setae (with long erect setae), the scutellum with a short

spine (without spine), the parameres thickened apically (Figs 42, 43) (slender entirely), and the different shape of the endosoma of the phallus (Figs 45, 46).

***Emesopsis heissi* nov.sp.**
(Figs 7, 8, 16, 22, 47-55, 57, 58)

Type series: Holotype: ♂ (Figs 7, 8, 16, 47-49), Mae Sa, 400-450 m alt., Mae Rim, Chiang Mai, Thailand, 4.viii.2001, T. Ishikawa. Paratypes: same data as holotype: 3♂♂, 10♀♀; same locality as holotype: 3♂♂, 1.viii.2001, T. Ishikawa; 6♂♂ (one shown in Figs 51-54), 3♀♀, 1.viii.2001, S. Nagashima; 3♂♂, 2.viii.2001, S. Nagashima; 2♂♂, 1♀, 3.viii.2001, T. Ishikawa; 1♀, 8.viii.2001, T. Ishikawa; 1♂, 13.viii.2001, T. Ishikawa; 2♂♂ (one shown in Figs 57, 58), 5♀♀, 16.v.2002, T. Ishikawa; 4♂♂ (one shown in Figs 22, 50), 7♀♀ (one shown in Fig. 55), 17.v.2002, T. Ishikawa; Pang Klang, 1,000-1,200 m alt., Doi Mae Tho, Chiang Mai: 1♂, 7.vii.2001, T. Ishikawa; Doi Suthep, 750-850 m alt., Chiang Mai: 1♂, 19.viii.2001, T. Ishikawa.

Diagnosis: Recognized by head and pronotum discally brownish yellow with long erect setae (Figs 7, 8), antennal segment I covered with long setae, which are about 8 times as long as maximum width of the segment I, meso- and metafemora covered with long setae, which are about 5 times as long as width of the base of the metafemur, meso- and metatibiae furnished with long setae in basal half, hemelytron only with pale brownish markings in the apical half (Fig. 22), abdomen covered with long erect setae, pygophore with a triangular, apically upturned posterior process (Figs 51, 52), paramere slender and apically curved strongly (Figs 53, 54), endosoma of phallus with a pair of large membranous expansions and a pair of small, apically ridged, sclerotized expansions in addition to a pair of vesica arms (Figs 57, 58), and vesica arms widened in basal 1/3 and slender and sinuate in apical 2/3 (Figs 57, 58).

Description:

Male: Coloration: Body generally brown (Figs 7, 8). Dorsum of head and disc of pronotum brownish yellow (Fig. 7). Antennal segment I brownish yellow, with brown annulation subapically; segments II, III and IV brown. Rostrum brown, with segments I and III pale on inner surface. Scutellar and metanotal spines brownish yellow. Proleg brownish yellow; coxa brown at basal 1/3 and at apical 1/5; trochanter brown at middle; femur (Fig. 16) weakly darkened basally, decorated with incomplete brown annulations at apical 1/10, apical 1/5 and apical 2/5, and with whitish apex; tibia darkened on apical 1/5. Meso- and metalegs brownish yellow; coxa darkened basally; femur weakly darkened subapically; tibia gradually darkened apicad. Hemelytron (Fig. 22) brownish yellow, decorated with about 8 transverse, vein-like, brown markings on basal half, and with many irregular, small to medium-sized, pale brownish markings on apical half. Abdomen brownish yellow, ventrally darkened along meson.

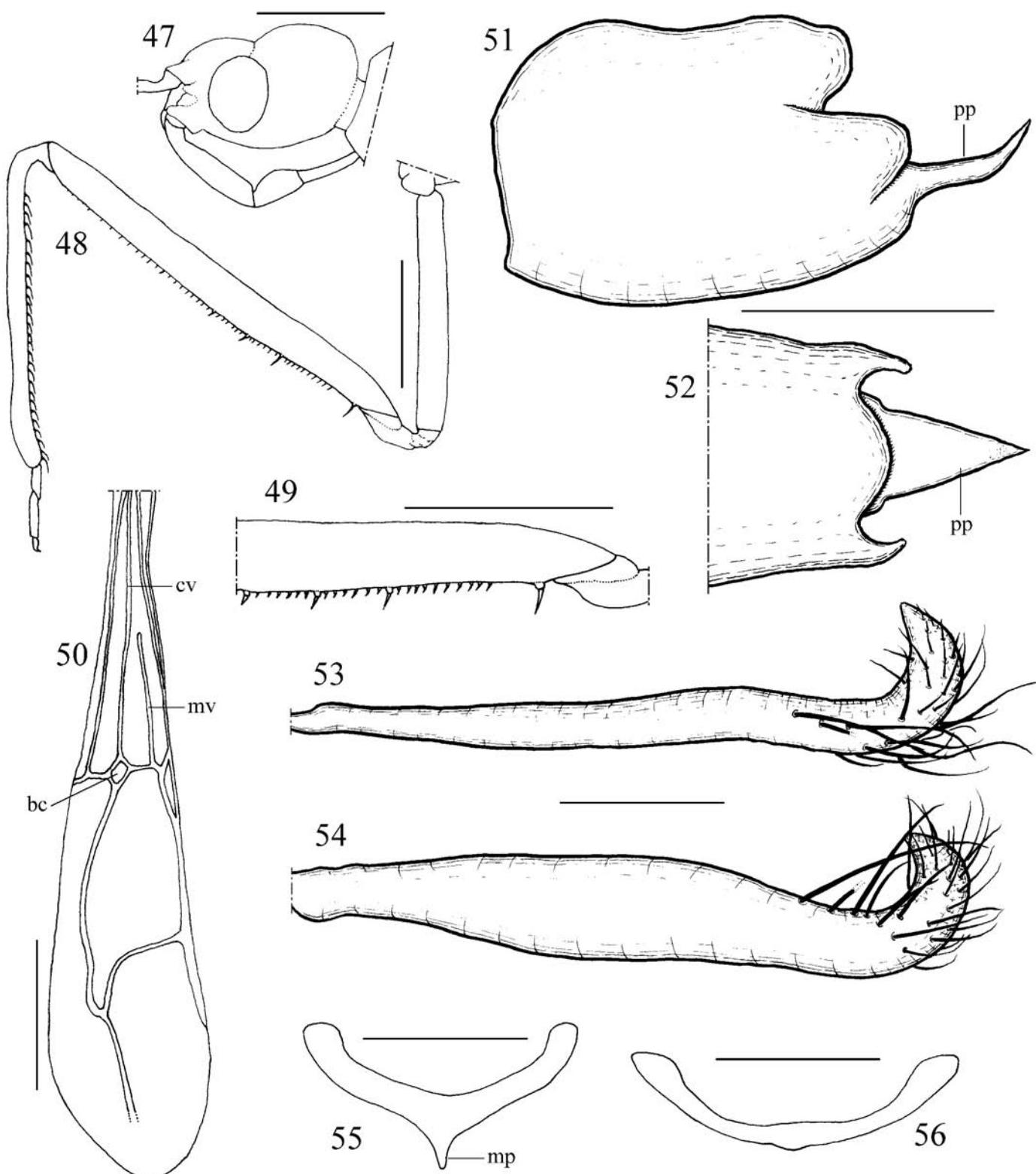
Structure: Head (Fig. 47) 1.4 times as long as width across eyes, furnished with long, erect, apically curved setae densely intermixed with wooly decumbent setae; anteoculus about 0.6 times as long as postoculus; interocular furrow arched posteriad. Eye

large, prominent laterad, not reaching level of ventral surface of head in lateral view (Fig. 47), 0.8 times as wide as interocular space in dorsal view. Antennal segment I covered with short curved setae intermixed with long, apically curved setae; longest setae about 8 times as long as maximum width of segment I; segments II, III and IV with short decumbent setae; proportion of segments I to IV 27: 19: 12: 5. Rostral segment I covered with curved setae on outer surface; segments II and III sparsely furnished with short suberect setae; proportion of segments I to III 12: 5: 7.

Pronotum 1.1 times as long as head, 1.1 times as long as humeral width, covered with long erect setae intermixed with wooly decumbent setae; anterior lobe with 3 pairs of glabrous areas; posterior lobe 1.7 times as long as anterior lobe, with anteriorly arcuate posterior margin. Scutellum apically with short spine horizontally produced posteriad. Metanotal spine obliquely erect, with blunt apex.

Proleg (Figs 16, 48, 49) covered with long, apically curved setae intermixed with decumbent short setae; coxa about 8 times as long as its maximum width; femur 1.8 times as long as coxa, about 11 times as long as its maximum width, with anteroventral and posteroventral series of 1 large, 3 medium-sized and about 45 small spines each; basal-most spine largest in posteroventral series, situated very near junction of trochanter and femur (Fig. 49); tibia 0.7 times as long as femur; tarsus 2-segmented, 0.25 times as long as tibia. Meso- and metalegs slender; femur covered with long erect setae entirely and short decumbent setae on apical 1/4; longest setae about 5 times as long as width of base of metafemur; tibia with short decumbent setae entirely and long, erect and suberect setae on basal half. Hemelytron (Figs 22, 50) exceeding apex of abdomen; basal cell (Fig. 50; bc) nearly quadrate; M and Cu veins proximal to discal cell (Fig. 50; cv, mv) not forming elongate subbasal cell, but connected by transverse, vein-like, brown markings; M vein distal to discal cell without bifurcate branch.

Abdomen furnished with long erect setae densely intermixed with short, decumbent and suberect setae; anterior portion of



Figs 47-56: *Emesopsis heissi* (47-55) and *E. albispinosa* (56) (setae omitted except for 53, 54). (47) head, lateral view; (48) proleg; (49) base of profemur; (50) right hemelytron; (51) pygophore, lateral view; (52) apical part of pygophore, ventral view; (53, 54) left paramere, dorsal (53) and lateral (54) views; (55, 56) styloid, dorsal view. Abbreviations: bc: basal cell; cv – Cu vein; mp – middle projection; mv – M vein; pp – posterior process. Scales: 0.1 mm for 53-56, 0.3 mm for 51, 52, 0.5mm for 47-49, 1.0 mm for 50.

fused tergites I and II with small erect spine. Pygophore excluding posterior process 1.5 times as long as its height, posterolaterally projected roundly (Figs 51, 52); posterior process (Figs 51, 52; pp) flattened dorsoventrally, triangular in ventral view, bent upward at about apical 1/3, with acute apex. Paramere (Figs 53, 54) slender, compressed laterally, strongly curved apically, pointed at apex, covered with erect and suberect setae variable in length on apical 1/4. Endosoma of phallus (Figs 57, 58) symmetrical, with a pair of membranous expansions and a pair of sclerotized expansions in addition to a pair of vesica arms; vesica arm (va) ventrally sclerotized, widened in basal 1/3, slender and sinuate in apical 2/3; membranous expansion (me) large, simple in form, shorter than vesica arm; sclerotized expansion (se) small, ridged apically, situated between membranous expansion and vesica arm.

Female: Almost the same in general appearance as male. Eye 0.7 times as wide as interocular space in dorsal view. Pronotum 1.2 times as long as humeral width. Abdomen apically narrowed and rounded. Valvulae II large, crimped transversely, weakly sclerotized along inner margin. Styloid (Fig. 55) narrow, arcuate posteriad, triangularly projected posteriorly at middle; middle projection (mp) blunt at apex.

Measurements (holotype): Body length 4.88 (paratypes: 4.75-5.18 in male, 4.75-5.25 in female). Head length including neck 0.63; width across eyes 0.46; interocular space 0.18. Antenna length 6.63; lengths of segments I, II, III and IV 2.85, 2.00, 1.25 and 0.53. Rostrum length 0.73; lengths of segments I, II and III 0.36, 0.16 and 0.21. Pronotum length 0.67; width across humeri 0.58. Hemelytron length 4.33. Lengths of femur, tibia and tarsus of proleg 1.36, 1.02 and 0.25; of mesoleg 2.54, 3.32 and 0.16; of metaleg 3.84, 5.08 and 0.18, respectively. Abdomen length 3.32.

Distribution: Northern Thailand.

Etymology: Named after Dr. Dipl. Ing. Ernst HEISS in honour of his great contribution to the Heteroptera; a noun in the genitive case.

Remarks: This new species resembles *Emesopsis nubila* UHLER 1893 in having the

brownish yellow dorsum of the body, long setae on the head, pronotum, legs and abdomen. However, this new species can be distinguished from the latter by the posterior pronotal lobe 1.7 times as long as the anterior one (in *E. nubila*, twice), the profemur about 11 times as long as its maximum width (about 8.5 times), and different shape of the endosoma of the phallus (Figs 57, 58).

Emesopsis nubila UHLER 1893 (Figs 9, 10, 17, 23)

Emesopsis nubilus UHLER 1893: 718 (nov.sp.).
Calphurnia reticulata DISTANT 1909: 503 (syn. by WYGODZINSKY & USINGER 1960: 248).

Calphurnia pacalis HORVÁTH 1914: 649 (syn. by WYGODZINSKY & USINGER 1960: 248).

Ploiariola pallida JEANNEL 1919: 151 (syn. by WYGODZINSKY & USINGER 1960: 248).

Emesopsis pilosus USINGER 1946: 42 (syn. by WYGODZINSKY & USINGER 1960: 248).

Specimens examined: Thailand: Mae Sa, 400-450 m alt., Mae Rim, Chiang Mai: 1♂ (Figs 9, 10, 17, 23), 1.viii.2001, T. Ishikawa; 1♀, 17.v.2002, T. Ishikawa.

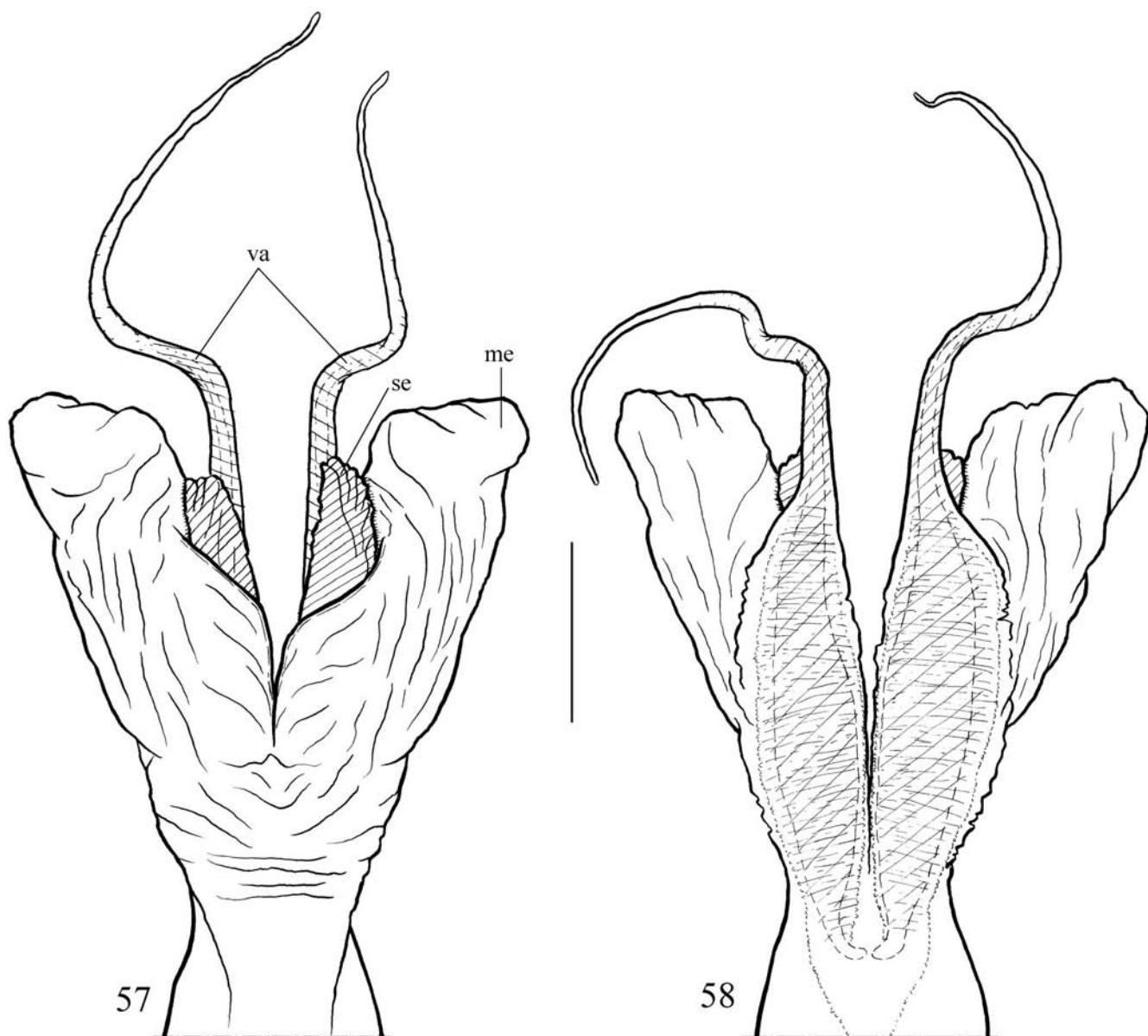
Diagnosis: Recognized by the head and pronotum discally yellowish brown with long erect setae (Figs 9, 10), the posterior pronotal lobe twice the length of the anterior pronotal lobe, the legs without conspicuous dark markings (Fig. 17), the meso- and metafemora covered with long erect setae, which are about 5 times as long as width of the base of the metafemur, meso- and metatibiae furnished with long erect setae in the basal half, the hemelytron iridescent with obscure markings (Fig. 23), the simple endosoma of phallus with a pair of vesica arms only, and the vesica arm thickened in basal half and slender in apical half. Body length about 4.5 mm. WYGODZINSKY (1966) provided many illustrations of the species including male and female genitalia.

Distribution: Tropicopolitan.

Emesopsis parispinea nov.sp. (Figs 11, 12, 18, 24, 59-69)

Type series: Holotype: ♂ (Figs 11, 12, 18, 59-61, 63-65, 67-69), Huai Kaeo, Chiang Mai, Thailand, 24.v.2002, T. TSURU.

Paratypes: Thailand: Doi Suthep, Chiang Mai: 1♀ (Figs 24, 62), 17.iv.1998, T. ISHIKAWA; Chiang Khian, 800-900 m alt., Doi Suthep, Chiang Mai: 1♀ (Fig. 66), 16.viii.2001, T. ISHIKAWA.



Figs 57, 58: Endosoma of *Emesopsis heissi*, dorsal (57) and ventral (58) views.

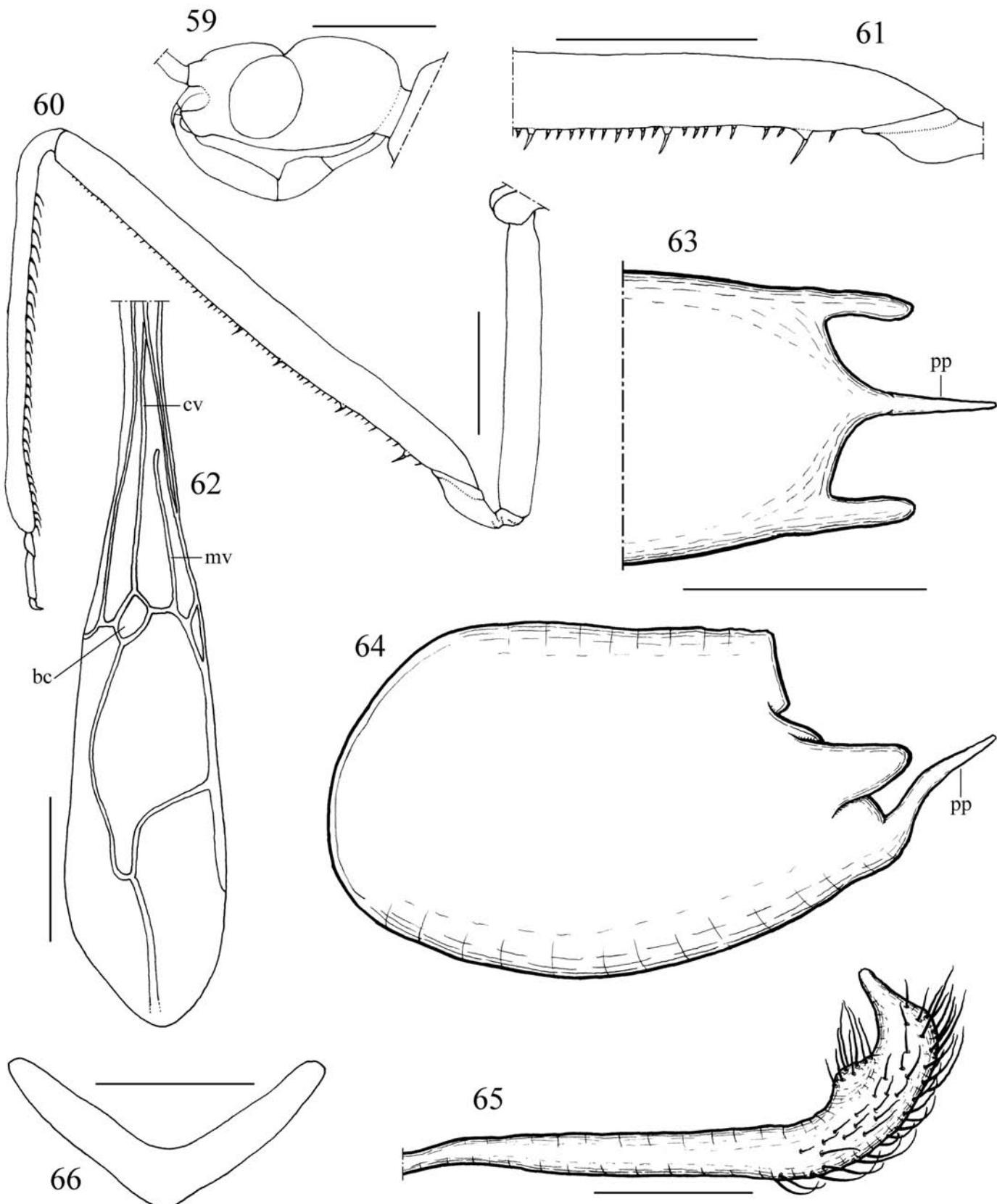
Abbreviations: me – membranous expansion; se – sclerotized expansion; va – vesica arm. Scale: 0.1 mm.

Diagnosis: Recognized by head and pronotum discally yellowish brown with long erect setae (Figs 11, 12), posteroventral series of profemur with basal-most spine smaller than second spine (Fig. 61), mesocoxa dark with brownish yellow apex, pygophore with a spine-shaped posterior process (Figs 63, 64), paramere roundly projected at apical 1/4 of inner surface (Fig. 65), endosoma of phallus with a pair of short, simple, membranous expansions and a pair of large, strongly curved, membranous expansions in addition to a pair of vesica arms (Figs 67-69), and long and looped vesica arm (Figs 67-69).

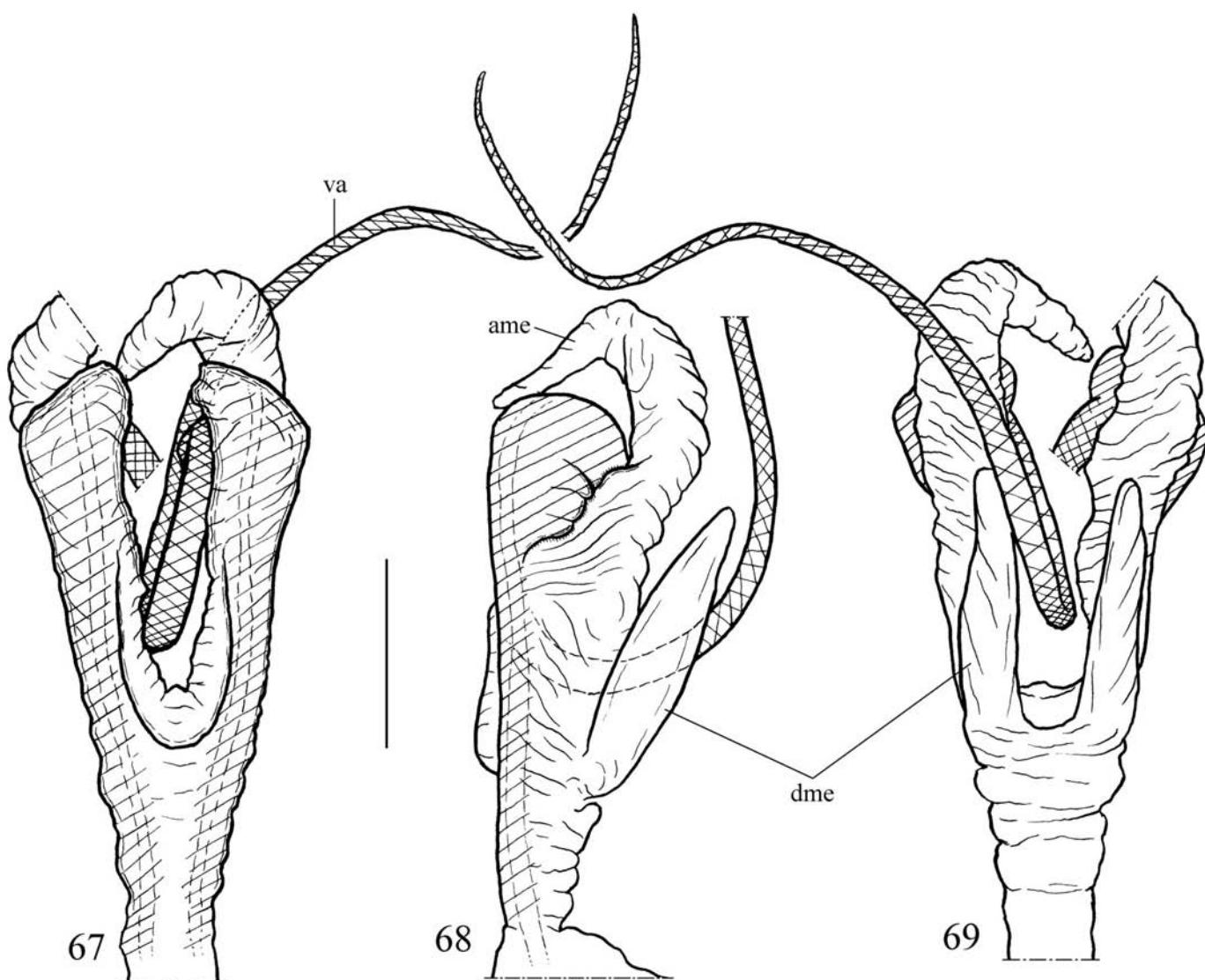
Description:

Male: Coloration: Body generally dark brown (Figs 11, 12). Dorsum of head and

disc of pronotum yellowish brown (Fig. 11). Antennal segment I brownish yellow; segments II, III and IV dark brown. Rostrum dark brown, with apical half of segment I on inner surface, apical half of segment II and basal half of segment III pale. Scutellar and metanotal spines brownish yellow. Proleg brownish yellow; coxa dark brown at base and on apical 3/10; trochanter dark brown on apical half; femur (Fig. 18) irregularly darkened at apex, middle and base; tibia darkened on apical 1/10, with narrow dark annulations at basal 1/10 and at apical 2/5; tarsal segment II brown. Meso- and metalegs brownish yellow; mesocoxa dark brown, with apex brownish yellow. Hemelytron (Fig. 24) brownish yellow, decorated with about 9 transverse, vein-like, dark brown



Figs 59-66: *Emesopsis parispinea* (setae omitted except for 65). (59) head, lateral view; (60) proleg; (61) base of profemur; (62) right hemelytron; (63) apical part of pygophore, ventral view; (64) pygophore, lateral view; (65) left paramere, dorsal view; (66) styloid, dorsal view. Abbreviations: bc – basal cell; cv – Cu vein; mv – M vein; pp – posterior process. Scales: 0.1 mm for 65, 66, 0.3 mm for 63, 64, 0.5mm for 59-61, 1.0 mm for 62.



Figs 67-69: Endosoma of *Emesopsis parispinea*, ventral (67), right-lateral (68) and dorsal (69) views. Abbreviations: ame – another pair of membranous expansions; dme – dorsal-most pair of membranous expansions; va – vesica arm. Scale: 0.1 mm.

markings on basal half, and with many irregular, small to medium-sized, somewhat inconspicuous, brownish markings on apical half. Abdomen dark brown.

Structure: Head (Fig. 59) 1.4 times as long as width across eyes, sparsely furnished with long, erect, apically curved setae densely intermixed with wooly decumbent setae; anteoculus about 0.6 times as long as postoculus; interocular furrow arched posteriad. Eye large, prominent laterad, not reaching level of ventral surface of head in lateral view (Fig. 59), as wide as interocular space in dorsal view. Antennae covered with decumbent setae; longest setae about 3 times as long as maximum width of segment I; proportion of segments I to IV 30: 24: 12: 5. Rostral segment I covered with curved setae on outer surface; segments II and III

sparsely furnished with short suberect setae; proportion of segments I to III 10: 5: 7.

Pronotum 1.1 times as long as head, 1.3 times as long as humeral width, sparsely covered with long erect setae intermixed with wooly decumbent setae; anterior lobe with several pairs of glabrous areas; posterior lobe 1.5 times as long as anterior lobe, with anteriorly arcuate posterior margin. Scutellum apically with short spine horizontally produced posteriad. Metanotal spine erect, with acute apex.

Proleg (Figs 18, 60, 61) covered with decumbent setae, and with long, erect and suberect setae on coxae and trochanters; coxa about 8.5 times as long as its maximum width; femur 1.9 times as long as coxa, about 12 times as long as its maximum width, with anteroventral and posteroventral series of 1

large, 3 medium-sized and about 55 small spines and conical tubercles each; posteroventral series with basal-most spine small and with spine next to basal-most one largest (Fig. 61); tibia 0.8 times as long as femur; tarsus 2-segmented, 0.17 times as long as tibia. Meso- and metalegs slender; femur covered with erect and suberect setae on basal 1/3 and with decumbent setae on apical 2/3; longest setae about twice as long as width of base of metafemur; tibia with short decumbent setae entirely. Hemelytron (Figs 24, 62) exceeding apex of abdomen; basal cell (Fig. 62; bc) rectangular; M and Cu veins proximal to discal cell (Fig. 62; cv, mv) not forming elongate subbasal cell, but connected by transverse, vein-like, brown markings; M vein distal to discal cell without bifurcate branch.

Abdomen furnished with short decumbent setae, with long erect setae basally; anterior portion of fused tergites I and II with erect spine. Pygophore excluding posterior process about 1.6 times as long as its height, posterolaterally projected strongly (Figs 63, 64); posterior process (Figs 63, 64; pp) spine-shaped, oblique, weakly curved at basal 1/3, obtuse at apex. Paramere (Fig. 65) curved and thickened in apical half, roundly projected at apical 1/4 of inner surface, blunt at apex, covered with erect and suberect setae variable in length on apical 1/3 of outer surface and on inner rounded projection. Endosoma of phallus (Figs 67-69) symmetrical, with 2 pairs of membranous expansions in addition to a pair of vesica arms; vesica arm (va) sclerotized, very long, widened basally, slender in remaining apical part; slender part of vesica arm looped basally; dorsal-most pair of membranous expansions (dme) short, simple in form; another pair of membranous expansions (ame) large and long, tapered, strongly curved ventrally.

Female: Almost the same in general appearance as male. Anteoculus 0.7 times as long as postoculus. Eye 0.75 times as wide as interocular space in dorsal view. Pronotum 1.2 times as long as head. Posterior pronotal lobe 1.6 times as long as anterior pronotal lobe. Abdomen apically narrowed and rounded. Valvulae II large, crimped transversely, weakly sclerotized along inner mar-

gin. Styloid (Fig. 66) V-shaped, widest at middle, slightly tapered toward both ends.

Measurements (holotype): Body length 5.50 (paratypes: 6.17 in female). Head length including neck 0.76; width across eyes 0.53; interocular space 0.18. Antenna length 7.49; lengths of segments I, II, III and IV 3.23, 2.54, 1.19 and 0.53. Rostrum length 0.87; lengths of segments I, II and III 0.39, 0.20 and 0.28. Pronotum length 0.88; width across humeri 0.67. Hemelytron length 4.83. Lengths of femur, tibia and tarsus of proleg 1.76, 1.34 and 0.23; of mesoleg 2.89, 3.88 and 0.15; of metaleg 4.45, 6.10 and 0.19, respectively. Abdomen length 2.38.

Distribution: Northern Thailand.

Etymology: From the Latin *parvispinea*, referring to the small basal-most spine on the posteroventral series of the profemur; an adjective.

Remarks: In general appearance, this new species is similar to one of the preceding new species, *Emesopsis ernsti*, from which it can be distinguished by the small basal-most spine of the posteroventral series of the profemur (Fig. 61) (in *E. ernsti*, large basal-most spine), the hemelytron lacking conspicuous dark marking within the discal cell (Fig. 24) (with a conspicuous dark marking), the posterior process of the pygophore spine-shaped (Figs 63, 64) (flattened), the paramere with a rounded projection on the inner surface (Fig. 65) (without rounded projection), and different shape of the endosoma of the phallus (Figs 67-69).

Key to species of *Emesopsis* from Thailand

- 1 Meso- and metafemora covered with long erect setae at least in apical half; mesocoxae brownish yellow (sometimes with dark suffusion), concolorous with metacoxae 2
- Meso- and metafemora covered with short decumbent or suberect setae at least in apical half; mesocoxae dark or dark brown on basal two-thirds, not concolorous with metacoxae ... 3
- 2 Posterior pronotal lobe twice as long as anterior pronotal lobe; profemur about 8.5 times as long as its maximum width (Fig. 17)
..... *E. nubila*
- Posterior pronotal lobe 1.7 times as long as anterior pronotal lobe; profemur about 11 times as long as its maximum width (Figs 16, 18) ..
..... *E. heissi* nov.sp.
- 3 Basal-most spine of profemoral posteroventral series smaller than second spine (Fig. 61)
..... *E. parispinea* nov. sp.
- Basal-most spine of profemoral posteroventral series larger than second spine 4
- 4 Scutellar spine long and whitish
..... *E. albispinosa*
- Scutellar spine short and brownish yellow .. 5
- 5 Head 1.3 times as long as width across eyes; posterior pronotal lobe 1.6 times as long as anterior pronotal lobe *E. ernsti* nov.sp.
- Head 1.7 times as long as width across eyes; posterior pronotal lobe 1.4 times as long as anterior pronotal lobe *E. bifurcata* nov.sp.

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We are grateful to Seidai Nagashima (Eight Consultants Co. Ltd., Okayama) and Tomoyuki Tsuru (Hokkaido University) for kindly providing the material used in this study. This study was partly supported by the Academic Frontier Cooperative Research Project, Tokyo University of Agriculture.

Zusammenfassung

Sechs Arten der Emesinae-Raubwanzen-gattung *Emesopsis* UHLER werden aus Thailand gemeldet. Zwei sind die schon vorher bekannten Arten *E. albispinosa* und *E. nubila*, die anderen werden neu beschrieben: *E. bifurcata* nov.sp. (inklusive Material aus Vietnam), *E. ernsti* nov.sp., *E. heissi* nov.sp. und *E. parispinea* nov.sp.

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- Addresses of the Authors:**
- Dr. Tadashi ISHIKAWA and
Prof. Shûji OKAJIMA
Laboratory of Insect Resources
Faculty of Agriculture
Tokyo University of Agriculture
Funako 1737
Atsugi-shi
Kanagawa
243-0034 Japan
E-Mail: kr-chu@nodai.ac.jp (for ISHIKAWA);
okajima@nodai.ac.jp (for OKAJIMA)